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Application Number	10/711,918
Filing Date	October 13, 2004
First Named Inventor	Jeffrey Tarvin
Art Unit	3676
Examiner Name	DiTrani, Angela M.
Attorney Docket Number	101.0166
Total Number of Pages in This Submission	22

ENCLOSURES *(Check all that apply)*

- [x] Fee Transmittal Form
  - [x] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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- [ ] Information Disclosure Statement
- [ ] Certified Copy of Priority Document(s)
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  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	VAN SOMEREN, PC		
Signature	Robert A Van Someren		
Printed name	Robert A. Van Someren		
Date	July 30, 2007	Reg. No.	36,038

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FEE TRANSMITTAL
For FY 2008

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 510.00

Complete if Known	
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METHOD OF PAYMENT (check all that apply)

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☑ Deposit Account Deposit Account Number: 50-3054 Deposit Account Name: VAN SOMEREN, PC

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	310	155	510	255	210	105	
Design	210	105	100	50	130	65	
Plant	210	105	310	155	160	80	
Reissue	310	155	510	255	620	310	
Provisional	210	105	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	210	105
Multiple dependent claims	370	185

Total Claims ______ - 20 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______
HP = highest number of total claims paid for, if greater than 20.

Indep. Claims ______ - 3 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______
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Multiple Dependent Claims
Fee ($) ______ **Fee Paid ($)** ______

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If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $260 ($130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

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SUBMITTED BY			
Signature	[signature]	Registration No. (Attorney/Agent) 36,038	Telephone 281-373-4369
Name (Print/Type)	Robert A. Van Someren		Date July 30, 2008

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Multiple Dependent Claims: Fee ($) ______ Fee Paid ($) ______

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SUBMITTED BY

Signature	*[signature]*	Registration No. (Attorney/Agent) 36,038	Telephone 281-373-4369
Name (Print/Type)	Robert A. Van Someren		Date July 30, 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Jeffrey Tarvin	§	Group Art Unit: 3676
Serial No.: 10/711,918	§	Examiner: DiTrani, Angela M.
Filed: October 13, 2004	§	
For: System and Method to Interpret Distributed Temperature Sensor Data and to Determine a Flow Rate in a Well	§	Atty Docket: 101.0166

Assistant Commissioner
for Patents
Washington, D.C. 20231

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July 30, 2008	
Date	Robert A. Van Someren

Sir:

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on June 3, 2008 and received by the Patent Office on June 6, 2008.

1. REAL PARTY IN INTEREST

The real party in interest is Schlumberger Technology Corporation, the Assignee of the above-referenced application by virtue of the Assignment recorded at reel 015241, frame 0832.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellant's legal representative in this Appeal. Schlumberger Technology

Corporation, the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

3. **STATUS OF CLAIMS**

Claims 1-11, 14-31, 34-41, 43-48 stand finally rejected by the Examiner as noted in the Office Action dated March 6, 2008. The rejection of claims 1-11, 14-31, 34-41 and 43-48 is appealed.

4. **STATUS OF AMENDMENTS**

The November 27, 2008 Amendment, submitted prior to the Examiner's Final Rejection mailed March 6, 2008, was entered by the Examiner. No amendments were entered after the Final Rejection.

5. **SUMMARY OF THE CLAIMED SUBJECT MATTER**

a.) Independent Claim 1

Independent claim 1 is directed to a methodology for analyzing distributed temperature data from a well. The methodology uses a distributed temperature sensor system (20) for obtaining temperature profile data from a portion of a wellbore (12). The temperature profile data is provided to a processor (22) which automatically determines whether fluids are flowing into or out of a tubing (16) located in the well based on processing of the temperature profile data. The methodology further comprises highlighting valuable information to a user related to the flow of fluid relative to the tubing (16).

b.) Independent Claim 10

Independent claim 10 is directed to a methodology for analyzing distributed temperature data from a well. The methodology comprises obtaining temperature profile data from a portion of a wellbore (12). The temperature profile data is provided to a processor (22) which

automatically processes the temperature profile data. The processing of temperature profile data highlights valuable information to a user and further comprises applying a model-fitting algorithm to the data. The processing also comprises constructing a match filter which includes incorporating modifications to the match filter to make it orthogonal to background trends.

c.) Independent Claim 22

Independent claim 22 is directed to a system (10) used to analyze distributed temperature data from a well. The system (10) comprises a distributed temperature sensor (20) which measures temperature profile data along a portion of a wellbore (12). The temperature profile data is provided to a processor (22) in real-time. The processor (22) is programmed to identify a particular temperature signal that corresponds to a specific downhole event having an inflow of relatively cooler fluid. The processor (22) is further able to output valuable information related to the specific downhole event.

d.) Independent Claim 31

Independent claim 31 is directed to a methodology that enables detection of certain events within a well. The methodology uses a distributed temperature sensor system (20) for obtaining data related to temperature. The data is obtained from a portion of a wellbore (12) over a period of time. The methodology further comprises automatically processing the data to detect specific events related to heat energy in the well. Data also is automatically processed to determine a flow rate of fluid in the well. The methodology further comprises displaying the results of the processing to a user.

e.) Independent Claim 40

Independent claim 40 is directed to a methodology that enables detection of certain events within a well. The methodology comprises obtaining data over a period of time from along a portion of a wellbore (12). The data is automatically processed to detect specific events related

to heat energy in the well. The automatic processing comprises applying a model-fitting algorithm to the data which further includes constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths. Constructing the match filter further comprises incorporating modifications to the filter to make it orthogonal to background trends. Additionally, the methodology comprises displaying results of the processing to a user.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

a.) Whether claims 1-9, 11-14, 16-39 and 42-48 are unpatentable under 35 U.S.C. § 102(b) as anticipated by the C.K. Woodrow (SPE/IADC 67729) reference.

b.) Whether claims 10 and 40 are unpatentable under 35 U.S.C. § 103(a) as obvious over the C.K. Woodrow (SPE/IADC 67729) reference in view of the Riza reference, U.S. Patent No: 6,360,037.

c.) Whether claim 15 is unpatentable under 35 U.S.C. § 103(a) as obvious over the C.K. Woodrow (SPE/IADC 67729) reference.

d.) Whether claim 41 is unpatentable under 35 U.S.C. § 103(a) as obvious over the C.K. Woodrow (SPE/IADC 67729) reference in view of the Tubel reference, US Patent No: 6,012,015.

7. **ARGUMENT**

a.) Rejection of claims 1-9, 11-14, 16-39 and 42-48 as unpatentable under 35 U.S.C. § 102(b) as anticipated by the C.K. Woodrow (SPE/IADC 67729) reference.

- Claims 1 and 21

Independent claim 1 was improperly rejected as anticipated by the C.K. Woodrow (SPE/IADC 67729) reference. The reference fails to disclose elements of the subject claims.

The C.K. Woodrow reference describes the deployment of an optical fiber distributed temperature system. The system is used to measure temperature in a well utilizing optical time domain reflectometry. As in conventional systems, however, the data is provided for manual review (see Background section of the present application). In the C.K. Woodrow reference, the temperature data "can be displayed on-site, stored for later analysis or transmitted in real-time via modem or scada/modbus links to office based engineers. The data can then be interpreted utilizing appropriate software applications." (See C.K. Woodrow reference, pg. 2, Principal of Operation). However, the cited reference fails to disclose elements of independent claim 1, and therefore the rejection under 35 USC 102(b) must be withdrawn.

For example, the C.K. Woodrow reference fails to disclose or suggest "automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data." After a thorough search of the C.K. Woodrow reference, Appellant is unable to locate any specific teachings in which the temperature data is processed, much less, processed for automatically determining whether fluids are flowing into or out of a tubing. The Response to Arguments section of the Office Action recites that displaying the data on-site teaches the provision of the temperature profile to a processor insofar as because the data is subsequently displayed to the user, this data must be processed. However, this contradicts teachings in the C.K. Woodrow reference which expressly refer to the data as "raw data."

As stated in the C.K. Woodrow reference, the data displayed in each of the two graphs is the raw, un-processed data extracted from the distributed temperature system. (For example, "The graph shows the raw data extracted from the distributed temperature system indicating the initial thermal profile of the wellbore (thicker line) and the various thermal profiles following initial kick-off." (C.K. Woodrow reference , pg. 3). Further, there is no automatic determining of the fluid flow into and out of the tubing. In the SPE/IADC article, an engineer is performing a manual analysis of raw data from the distributed temperature sensors. "The temperature data can be displayed on-site, stored for later analysis or transmitted in real-time via modem or scada/modbus links to office based engineers. The data can *then* be interpreted utilizing appropriate software applications." (Emphasis added). (C.K. Woodrow reference, pg. 2, Principle of Operation). As such, there is no automatic interpretation of the data. Accordingly, the C.K. Woodrow reference fails to disclose or suggest at least these elements of claim 1.

By way of further example, the C.K. Woodrow reference fails to disclose or suggest "highlighting valuable information to a user related to the flow of fluid relative to the tubing." The graph shown in Fig. 4 was manually interpreted by an engineer as showing the gaslift valves opening and closing. However, none of this information is highlighted or indicated as such on the graph, for example. As a result, the C.K. Woodrow reference further fails to disclose at least this additional element of claim 1. Accordingly, due to at least these reasons, the rejection under 35 USC 102(b) of claim 1 is unsupported and should be withdrawn.

- <u>Claim 2</u>

With respect to dependent claim 2, the C.K. Woodrow reference only displays graphs of raw data (see above) and does not indicate that the raw data shown has been processed via removing noise from the temperature profile, much less, automatically processed via removing noise. Accordingly, the C.K. Woodrow reference fails to disclose "wherein automatically determining comprises removing noise from the temperature profile data" as recited in claim 2.

- **Claim 3**

Similarly, the C.K. Woodrow reference fails to disclose or suggest any additional steps taken for processing of the raw temperature profile. As such, the C.K. Woodrow reference does not disclose removing low order spatial trends as recited in dependent claim 3.

- **Claim 4**

The C.K. Woodrow reference also fails to make any disclosure related to utilizing a high-pass filter as recited in dependent claim 4.

- **Claim 5**

The C.K. Woodrow reference further fails to disclose utilizing a low-pass filter as recited in dependent claim 5.

- **Claims 6-9**

Dependent claims 6-9 refer to applying a model-fitting algorithm to the data. However, the C.K. Woodrow reference recites that "we have not yet established a thermal model that can accurately match the observed temperature profile." (C.K. Woodrow reference, pg. 3, column 2, paragraph 2). In fact, the C.K. Woodrow reference distinguishes its technology by stating "this technology really can deliver qualitative information to directly improve reservoir and well performance without sophisticated modeling." (C.K. Woodrow reference, pg. 3, column 2, paragraph 2). Accordingly, the C.K. Woodrow reference fails to disclose "applying a model-fitting algorithm to the data" as recited in dependent claims 6-9.

- **Claim 11**

The C.K. Woodrow reference also fails to make any disclosure related to trend removal and filtering of the temperature profile data as recited in dependent claim 11.

- **Claim 14**

The C.K. Woodrow reference also fails to disclose obtaining the temperature profile data with a "temporary" distributed temperature sensor installation as recited in dependent claim 14.

- **Claims 16-20**

The C.K. Woodrow reference further fails to disclose using a match filter as recited in dependent claims 16-20. In the "Future plans" section of the C.K. Woodrow reference, the reference suggests that additional thermal modeling study work may be performed using commercially available software such as WellCAT or PLATO. However, the reference provides no teaching or suggestion either identifying what procedures to perform or even if the commercially available software is capable of performing the claimed procedures. For example, the reference provides no disclosure related to utilizing a match filter.

- **Claims 22-30**

The C.K. Woodrow reference describes outputting raw temperature profile data in the form of a graph. The graph is then interpreted through observation to identify downhole events. For example, the reference recites "The unusual non-linear features that have been observed in the static 'geothermal' gradient in fig. 4 and 5…," (C.K. Woodrow reference, pg. 3, column 2, paragraph 4). There is no disclosure or suggestion in the C.K. Woodrow reference for a "processor being programmed to identify a particular temperature signal that corresponds to a specific downhole event" as recited in independent claim 22. As such, there is also no disclosure or suggestion that "the processor outputs valuable information related to the specific downhole

event to a user" as further recited in independent claim 22 For at least these reasons, the rejection under 35 USC 102(b) is unsupported and should be withdrawn.

Claims 23-30 ultimately depend from independent claim 22 and recite additional elements. Therefore, the rejection of these dependent claims under 35 USC 102(b) also should be withdrawn.

- **Claims 31, 34-39, 41 and 43-48**

The C.K. Woodrow reference also fails to disclose each and every element of independent claim 31. For example, the C.K. Woodrow reference fails to disclose or suggest "automatically processing the data to detect specific events related to heat energy in the well" and "further automatically processing the data to determine a flow rate of fluid in the well," as recited in claim 31. As described earlier, the graphs shown in fig. 4 and 5 of the C.K. Woodrow reference contain raw data extracted from the distributed temperature system and therefore are not automatically processed. Further, the C.K. Woodrow reference recites that the engineers "had also hoped to infer flowrate from the temperature gradient observed below the bottom gaslift valve." (C.K. Woodrow reference, pg. 3). However, the reference provides no teaching related to actually determining flow rate, and the reference provides no indication that the authors were successful in their hope. In addition, their failure at using the system to determine the flow rate of fluid in the well is characterized by their failure to establish a thermal model for the system. ("we have not yet established a thermal model that can accurately match the observed temperature profile." C.K. Woodrow reference, pg. 3). Accordingly, the C.K. Woodrow reference actually confirms that its methodology lacked elements of independent claim 31. Consequently, the rejection under 35 USC 102(b) should be withdrawn.

Claims 34-39, 41, 43-48 ultimately depend from independent claim 31 and recite additional unique elements. Therefore, the rejection of these dependent claims under 35 USC 102(b) also should be withdrawn.

b.) Rejection of claims 10 and 40 as unpatentable under 35 U.S.C. § 103(a) for being obvious over the C.K. Woodrow (SPE/IADC 67729) reference in view of the Riza reference, U.S. Patent No: 6,360,037.

- **Claims 10 and 40**

Independent claims 10 and 40 were rejected under 35 U.S.C. §103(a) under the C.K. Woodrow reference in view of the Riza reference. This rejection is respectfully traversed. The combination of references fails to establish a *prima facie* case of obviousness, and therefore the rejection must be withdrawn.

The C.K. Woodrow reference is relied on as teaching the elements of claims 10, 40, although the reference is said to fail in explicitly teaching construction of a match filter comprising incorporating modifications to the filter to make it orthogonal to background trends. (See March 6, 2008 Office Action, pg. 6) The Riza reference is relied on for these teachings. Appellant disagrees with the Examiner's characterization of the Riza reference. As discussed above, however, the C.K. Woodrow reference fails to disclose or suggest the unique approach of automatically processing data to enable and improve its usefulness to an operator. Therefore, regardless of whether the Riza reference provides teachings related to match filters, the combination of references fails to disclose or suggest the missing elements related to automatic processing of data.

For example, the C.K. Woodrow and the Riza references, taken alone or in combination, fail to disclose, teach, or suggest "automatically processing the temperature profile data to highlight valuable information to the user" wherein the automatic processing comprises "applying a model-fitting algorithm to the data" as recited in independent claim 10. Similarly, the references fail to disclose, teach or suggest "automatically processing the data to detect specific events related to heat energy in the well" wherein the automatic processing comprises "applying a model-fitting algorithm to the data and applying the model-fitting algorithm comprises constructing a match filter and using extrema of a convolution of the filter with data to

select candidate depths" as recited in independent claim 40. Accordingly, no *prima facie* case of obviousness has been established, and the rejection under 35 USC 103(a) should be withdrawn.

c.) Rejection of claim 15 as unpatentable under 35 U.S.C. § 103(a) for being obvious over the C.K. Woodrow reference.

- <u>Claim 15</u>

Claim 15 was improperly rejected as obvious over the C.K. Woodrow reference. No *prima facie* case of obviousness has been established.

Claim 15 directly depends from independent claim 1 and is patentable over the cited reference for the reasons provided above with respect to independent claim 1 as well as for the additional unique subject matter recited in dependent claim 15. The C.K. Woodrow reference does not establish *prima facie* obviousness, and the rejection under 35 USC 103(a) should be withdrawn.

d.) Rejection of claim 41 as unpatentable under 35 U.S.C. § 103(a) for being obvious over the C.K. Woodrow reference in view of the Tubel reference, US Patent No: 6,012,015.

- <u>Claim 41</u>

Claim 41 was improperly rejected as obvious over the C.K. Woodrow reference in view of the Tubel reference. No *prima facie* case of obviousness has been established.

Claim 41 directly depends from independent claim 31 and is patentable over the cited references for the reasons provided above with respect to independent claim 31 as well as for the additional unique subject matter recited in dependent claim 41. Addition of the Tubel reference does not obviate the deficiencies of the C.K. Woodrow reference to establish a *prima facie* case of obviousness. Even if the Tubel reference discloses the subject matter for which it is cited, it

still fails to provide the elements missing from the C.K. Woodrow reference as discussed above with reference to independent claim 31. Therefore, the rejection of dependent claim 41 under 35 USC 103(a) should be withdrawn.

In view of the above remarks, Applicant respectfully submits the Examiner has provided no supportable position or evidence that any of the claims 1-11, 14-31, 34-41 and 43-48 is anticipated under 35 U.S.C. § 102(b) or obvious under 35 U.S.C. § 103(a). Accordingly, Applicant respectfully requests that the Board find claims 1-11, 14-31, 34-41 and 43-48 patentable over the art of record, withdraw all outstanding rejections, and allow claims 1-11, 14-31, 34-41 and 43-48.

An Appeal Brief fee in the amount of $510 is provided on the attached form PTO-2038. However, if the amount listed thereon is insufficient, or if the amount is unable to be charged to the credit card for any other reason, the Commissioner is authorized to charge Deposit Account No. 50-3054.

Respectfully submitted,

Date: July 30, 2008

Robert A. Van Someren
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8. CLAIMS APPENDIX

1. A method for analyzing distributed temperature data from a well comprising:
using a distributed temperature sensor system to obtain temperature profile data along a portion of a wellbore;
providing the temperature profile data to a processor;
automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data; and
highlighting valuable information to a user related to the flow of fluid relative to the tubing.

2. The method as recited in claim 1, wherein automatically determining comprises removing noise from the temperature profile data.

3. The method as recited in claim 1, wherein automatically determining comprises removing low order spatial trends.

4. The method as recited in claim 1, wherein automatically determining comprises utilizing a high-pass filter.

5. The method as recited in claim 1, wherein automatically determining comprises utilizing a low-pass filter.

6. The method as recited in claim 1, wherein automatically determining comprises applying a model-fitting algorithm to the data.

7. The method as recited in claim 6, wherein applying a model-fitting algorithm comprises selecting regions for fitting and fitting a model to data.

8. The method as recited in claim 7, wherein applying a model-fitting algorithm further comprises testing results for statistical significance.

9. The method as recited in claim 6, wherein applying a model-fitting algorithm comprises constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths.

10. A method for analyzing distributed temperature data from a well, comprising:

obtaining temperature profile data along a portion of a wellbore;

providing the temperature profile data to a processor; and

automatically processing the temperature profile data to highlight valuable information to a user, wherein automatically processing comprises applying a model-fitting algorithm to the data and applying the model-fitting algorithm comprises constructing a match filter, further wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends.

11. The method as recited in claim 1, wherein automatically determining comprises trend removal and filtering of the temperature profile data.

14. The method as recited in claim 1, wherein using comprises obtaining the temperature profile data with a temporary distributed temperature sensor installation.

15. The method as recited in claim 1, wherein using comprises obtaining the temperature profile data with a slickline distributed temperature sensing system.

16. The method as recited in claim 1, wherein automatically determining comprises utilizing a match filter.

17. The method as recited in claim 16, wherein the match filter is used to detect particular temperature signals corresponding to a particular downhole event.

18. The method as recited in claim 17, wherein the downhole event comprises the location of a gas lift valve.

19. The method as recited in claim 17, wherein the downhole event comprises a hole in a tubing.

20. The method as recited in claim 17, wherein the downhole event comprises a leak in a wellbore completion tool.

21. The method as recited in claim 1, wherein the automatically determining occurs in real-time with the obtaining data.

22. A system to analyze distributed temperature data from a well, comprising:

a distributed temperature sensor that measures temperature profile data along a portion of a wellbore;

a processor that receives the temperature profile data in real time, the processor being programmed to identify a particular temperature signal that corresponds to a specific downhole event having an inflow of relatively cooler fluid; and

wherein the processor outputs valuable information related to the specific downhole event to a user.

23. The system as recited in claim 22, wherein the distributed temperature system comprises an optical fiber.

24. The system as recited in claim 22, wherein the distributed temperature sensor comprises an opto-electronic unit to launch optical pulses downhole.

25. The system as recited in claim 24, wherein the opto-electronic unit is coupled to the processor by a communication link.

26. The system as recited in claim 25, wherein the communication link comprises a hardline link.

27. The system as recited in claim 25, wherein the communication link comprises a wireless link.

28. The system as recited in claim 22, wherein the processor is embodied in a portable computer.

29. The system as recited in claim 23, further comprising a production tubing deployed in the wellbore with the optical fiber.

30. The system as recited in claim 29, wherein the production tubing is combined with a gas lift system.

31. A method of detecting certain events within a well, comprising:

using a distributed temperature sensor system to obtain data related to temperature over a period of time along a portion of a wellbore;

automatically processing the data to detect specific events related to heat energy in the well;

further automatically processing the data to determine a flow rate of fluid in the well; and

displaying results to a user.

34. The method as recited in claim 31, wherein automatically processing comprises processing the data on a processor-based computer.

35. The method as recited in claim 31, wherein automatically processing comprises processing backscattered light signals.

36. The method as recited in claim 31, wherein automatically processing comprises applying a model-fitting algorithm to the data.

37. The method as recited in claim 36, wherein applying a model-fitting algorithm comprises selecting regions for fitting and fitting a model to data.

38. The method as recited in claim 37, wherein applying a model-fitting algorithm further comprises testing results for statistical significance.

39. The method as recited in claim 36, wherein applying a model-fitting algorithm comprises constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths.

40. A method of detecting certain events within a well, comprising:

obtaining data over a period of time along a portion of a wellbore;

automatically processing the data to detect specific events related to heat energy in the well; and

displaying results to a user, wherein automatically processing comprises applying a model-fitting algorithm to the data and applying the model-fitting algorithm comprises constructing a match filter and using extrema of a convolution of the filter with data to select candidate depths, wherein constructing the match filter comprises incorporating modifications to the filter to make it orthogonal to background trends.

41. The method as recited in claim 31, wherein automatically processing comprises applying a phenomenological model to the data.

43. The method as recited in claim 31, wherein automatically processing comprises detecting particular temperature signals corresponding to location of a gas lift valve.

44. The method as recited in claim 31, wherein automatically processing comprises detecting particular temperature signals corresponding to a wellbore completion tool leak.

45. The method as recited in claim 31, wherein automatically processing comprises detecting particular temperature signals corresponding to a hole in a production tubing.

46. The method as recited in claim 31, wherein displaying comprises displaying results in graphical form on a display monitor.

47. The method as recited in claim 31, wherein automatically processing comprises utilizing a match filter.

48. The method as recited in claim 31, wherein automatically processing occurs real-time with the obtaining data.

9. **EVIDENCE APPENDIX**

Not Applicable

10. **RELATED PROCEEDINGS APPENDIX**

Not Applicable